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PATENT APPLICATION

ATTORNEY DOCKET NO. 200207272-1

IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Wai Yuen Ho

Confirmation No.: 8419

Application No.: 10/789,744

Examiner: Leonard S. Liang

Filing Date: February 27, 2004

Group Art Unit: 2853

Title: AN AUTOMATIC TRANSMISSION SYSTEM FOR A PRINTER CARRIAGE DRIVE

Mail Stop Appeal Brief-Patents  
Commissioner For Patents  
PO Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on April 9, 2009.

☐ The fee for filing this Appeal Brief is \$540.00 (37 CFR 41.20).

☒ No Additional Fee Required.

**(complete (a) or (b) as applicable)**

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month  
\$130

☐ 2nd Month  
\$490

☐ 3rd Month  
\$1110

☐ 4th Month  
\$1730

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$ 00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

Respectfully submitted,

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Attorney Docket No.: 200207272-1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

<b>Inventor(s):</b>	Wai Yuen HO	<b>Confirmation No.:</b>	8419
<b>Serial No.:</b>	10/789,744	<b>Examiner:</b>	Leonard S. Liang
<b>Filed:</b>	February 27, 2004	<b>Group Art Unit:</b>	2853
<b>Title:</b>	AN AUTOMATIC TRANSMISSION SYSTEM FOR A PRINTER CARRIAGE DRIVE		

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF - PATENTS**

Sir:

This is an Appeal Brief in connection with the decisions of the Examiner in a Final Office Action dated February 9, 2009 and the Notice of Appeal filed on April 9, 2009. This is a second Appeal Brief in connection with the above-identified application because the Examiner reopened prosecution of the above-identified application in response to the first Appeal Brief filed on April 28, 2008.

Each of the topics required in an Appeal Brief and a Table of Contents are presented herewith and labeled appropriately.

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**(1) Real Party In Interest**

The real party in interest is Hewlett-Packard Development Company, L.P.

**(2) Related Appeals And Interferences**

There are no other appeals or interferences related to this case.

**(3) Status Of Claims**

Claims 1, 4-7, and 10-15 are pending and rejected. Claims 2, 3, 8, and 9 were canceled. All pending claims 1, 4-7, and 10-15 are hereby appealed.

**(4) Status of Amendments**

No amendment was filed subsequent to the Final Office Action dated February 9, 2009.

**(5) Summary Of Claimed Subject Matter**

**Independent claims 1, 7, and 14**

Claims 1, 7, and 14 of the present invention are the independent claims at issue in this appeal. It should be understood that the citations below to the original disclosure as providing support for claimed features are merely exemplary and do not limit the claimed features to only those citations.

**According to one embodiment in claim 1**, there is provided a carriage drive system, comprising:

a variable speed drive motor and a gearing mechanism configured to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle, and wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having (Fig. 2B at 200-218; specification at, from page 5, line 7, to page 6, line 9):

a sun gear driven by the drive motor (Fig. 2B at 206; specification at, from page 5, line 7, to page 6, line 9);

a ring gear (Fig. 2B at 208; specification at, from page 5, line 7, to page 6, line 9); and

a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear (Fig. 2B at 210; specification at, from page 5, line 7, to page 6, line 9); and

a centrifugal clutch operable to enable the gearing mechanism to switch between the first and second gear ratios automatically based upon an operational speed of the drive motor (Fig. 2B at 216; specification at, from page 5, line 7, to page 6, line 9).

**According to one embodiment in claim 7**, there is provided a printer, comprising:

a movable carriage supporting print heads having an ink ejecting nozzle (original claim 7);

a slide rod for supporting and guiding the movable carriage (original claim 7);

a variable speed drive motor configured to propel the movable carriage along the slide rod, wherein the variable speed drive motor is an electric motor (Fig. 2B at 200; specification at, from page 5, line 7, to page 6, line 9);

a gearing mechanism having a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed, wherein the gearing mechanism comprises a planetary gear assembly having (Fig. 2B at 204-218; specification at, from page 5, line 7, to page 6, line 9):

a sun gear driven by the drive motor (Fig. 2B at 206; specification at, from page 5, line 7, to page 6, line 9);

a ring gear (Fig. 2B at 208; specification at, from page 5, line 7, to page 6, line 9); and

a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear (Fig. 2B at 210; specification at, from page 5, line 7, to page 6, line 9); and

a centrifugal clutch operable to switch between the first and second gear ratios wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the first and second gear ratios occurs automatically based upon an operational speed of the drive motor (Fig. 2B at 216; specification at, from page 5, line 7, to page 6, line 9).

**According to one embodiment in claim 14**, there is provided a method for printing, comprising:

activating a variable speed drive motor and a gearing mechanism to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and, wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having (Fig. 2B at 200-218; specification at, from page 5, line 7, to page 6, line 9):

a sun gear driven by the drive motor (Fig. 2B at 206; specification at, from page 5, line 7, to page 6, line 9);

a ring gear (Fig. 2B at 208; specification at, from page 5, line 7, to page 6, line 9); and

a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear (Fig. 2B at 210; specification at, from page 5, line 7, to page 6, line 9); and

switching between the first and second gear ratios (Fig. 2B at 200-218; specification at, from page 5, line 7, to page 6, line 9);

wherein switching between the first and second gear ratios occurs automatically based on an operational speed of the drive motor (Fig. 2B at 200-218; specification at, from page 5, line 7, to page 6, line 9).

**(6) Grounds of Rejection to be Reviewed on Appeal**

Whether claims 1, 4-7, and 10-15 were properly rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Ito et al. (U.S. Patent No. 5,097,189, hereinafter “Ito”) in view of Kushino et al. (Japanese Patent Document No. 2000104799A, hereinafter “Kushino”) and Black et al. (U.S. Patent No. 3,780,652, hereinafter “Black”).

**(7) Arguments**

**Reversal of the rejection of claims 1, 4-7, and 10-15 under 35 U.S.C. §103(a) as being unpatentable over Ito in view of Kushino and Black is respectfully requested.**

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, 82 USPQ2d 1385 (2007):

“Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” Quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966).

As set forth in MPEP 2143.03, to ascertain the differences between the prior art and the claims at issue, “[a]ll claim limitations must be considered” because “all words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385. According to the Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in view of *KSR International Co. v. Teleflex Inc.*, Federal



Register, Vol. 72, No. 195, 57526, 57529 (October 10, 2007), once the *Graham* factual inquiries are resolved, there must be a determination of whether the claimed invention would have been obvious to one of ordinary skill in the art based on any one of the following proper rationales:

(A) Combining prior art elements according to known methods to yield predictable results; (B) Simple substitution of one known element for another to obtain predictable results; (C) Use of known technique to improve similar devices (methods, or products) in the same way; (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (E) “Obvious to try”—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, 82 USPQ2d 1385 (2007).

Furthermore, as set forth in *KSR International Co. v. Teleflex Inc.*, quoting from *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006), “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasonings with some rational underpinning to support the legal conclusion of obviousness.”

Therefore, if the above-identified criteria and rationales are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

Claim 1 recites a carriage drive system, comprising, *inter alia*, “a centrifugal clutch operable to enable the gearing mechanism to switch between the first and second gear ratios automatically based upon an operational speed of the drive motor,” wherein a sun gear is driven by the drive motor.

Ito fails to teach or suggest a centrifugal clutch operable to enable a gearing mechanism to switch between first and second gear ratios automatically based upon an operational speed of a drive motor, where a sun gear is driven by the drive motor. More specifically, Ito discloses a recording apparatus, in which a standard stepping motor is used as a driving source to reciprocate a carriage. Ito at Abstract, lines 1-2. However, as conceded in the Final Office Action at page 3, Ito fails to teach or suggest the above-discussed features of claim 1.

Kushino fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito. More specifically, the Final Office Action at page 5 cites the Abstract and paragraphs 10, 11, 15, and 16 of Kushino as showing a centrifugal clutch operable to enable a gearing mechanism to switch between first and second gear ratios automatically based upon an operational speed of a drive motor. In the cited portions, for example, at the Abstract, Kushino discloses as follows.

Novelty - A sun gear (20) connected with an input shaft (18) meshes with a carrier gear (24) connected with output shaft (21) when the rotations of the output shaft is under predetermined speed, the rotation of a ring gear (29) meshing with a planet gear (25) of the carrier is permitted. When exceeding predetermined value, a centrifugal clutch (13) prevents the rotation of the ring gear.

Description – A two way clutch (14) locks the rotation of the ring gear, when the ring gear rotates in reverse directions with respect to the gear.

**Based on the speed of the output shaft [21] the rotation of the ring gear [29] is controlled with a centrifugal clutch [13].**

In Fig. 2 of Kushino, where the sun gear 20 is driven by the input shaft 18, the centrifugal clutch 13 controls the ring gear 29 based on the speed of the output shaft 21.

However, since the centrifugal clutch 13 controls the ring gear 29 based on the speed of the output shaft 21, Kushino fails to teach or suggest that gear ratios are switched based upon a speed of the input shaft 18, which drives the sun gear 20. Thus, Kushino fails to teach or suggest an automatic switching between first and second gear ratios based upon an operational speed of a drive motor, wherein a sun gear is driven by the drive motor, as claimed in independent claim 1.

In addition, Black fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito and Kushino. More specifically, the Final Office Action at page 8 cites column 11, lines 11-24, of Black as showing features related to a two-way universal clutch. In that cited portion, Black discloses that a Floyd drive unit is “basically a two-way universal clutch.” However, such a two-way universal clutch and the remainder of Black’s disclosure fail to teach or suggest the above-discussed features of claim 1.

Thus, for at least the above-discussed reasons, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of claim 1. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect to claim 1. Reversal of the rejection of claim 1 and its dependent claims under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

Independent claims 7 and 14 each recite features similar to those features of independent claim 1. Thus, for at least the above-discussed reasons with respect to claim 1, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of independent claims 7 and 14. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect

to claim 1. Reversal of the rejection of independent claims 7 and 14 and their respective dependent claims under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

**Dependent claims 4, 10, and 15**

Further, in addition to the above-discussed reasons for the reversal of the rejection of independent claims 1, 7 and 14, the rejection of claims 4, 10, and 15 that respectively depend therefrom should be reversed for at least the following additional reasons.

Claim 4 recites that “operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear.” Claims 10 and 15 each recite similar features.

As conceded in the Final Office Action at page 3, Ito fails to teach or suggest the above-discussed features of claims 4, 10, and 15.

Kushino fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito. More specifically, Kushino discloses that, in Fig. 2, when rotations of the output shaft 21 exceed a predetermined value, “a centrifugal clutch (13) prevents the rotation of the ring gear.” Kushino at Abstract. However, in Fig. 2 of Kushino, by preventing the rotation of the ring gear 29 when the centrifugal clutch 13 engages the ring gear 29 at a high speed of the output shaft 21, a 1:1 gear ratio between the sun gear 20 and the ring gear 29 is not obtained in that, at a high speed, the sun gear 20 rotates in response to input shaft rotations but the ring

gear 29 does not rotate due to the foregoing clutch engagement. Thus, Kushino fails to teach or suggest that an operation of a drive motor at a high speed causes a centrifugal clutch to engage a ring gear causing planet gears and a drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between a sun gear and the ring gear, as discussed for claims 4, 10, and 15.

Black fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito and Kushino. More specifically, the Final Office Action at page 8 cites column 11, lines 11-24, of Black as showing features related to a two-way universal clutch. In the cited portion, Black discloses that a Floyd drive unit is “basically a two-way universal clutch.” However, such a two-way universal clutch and the remainder of Black’s disclosure fail to teach or suggest the above-discussed features of claims 4, 10, and 15.

For at least the above-discussed reasons, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of claims 4, 10, and 15. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect to claims 4, 10, and 15. Reversal of the rejection of claims 4, 10, and 15 under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

**Dependent claims 5 and 11**

Further, in addition to the above-discussed reasons for the reversal of the rejection of independent claims 1 and 7, the rejection of claims 5 and 11 that respectively depend therefrom should be reversed for at least the following additional reasons.

Claims 5 and 11 each recite “a speed calibration member for adjusting a gear ratio between the drive motor and the ring gear.”

As conceded in the Final Office Action at page 3, Ito fails to teach or suggest the above-discussed features of claims 5 and 11.

Kushino fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito. More specifically, Kushino discloses that, in Fig. 2, when rotations of the output shaft 21 exceed a predetermined value, “a centrifugal clutch (13) prevents the rotation of the ring gear.” Kushino at Abstract. However, in Fig. 2 of Kushino, such a prevention of the rotation of the ring gear 29 due to an engagement by the centrifugal clutch 29 at a high speed of the output shaft 21 does not teach or suggest an adjustment of a gear ratio between the input shaft 18 and the ring gear 29. The remainder of Kushino’s disclosure fails to cure the foregoing deficiencies. Thus, Kushino fails to teach or suggest the above-discussed features of claims 5 and 11.

Black fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito and Kushino. More specifically, the Final Office Action at page 8 cites column 11, lines 11-24, of Black as showing features related to a two-way universal clutch. In the cited portion, Black discloses that a Floyd drive unit is “basically a two-way universal clutch.” However, such a two-way universal clutch in Black and the remainder of Black’s disclosure fail to teach or suggest the above-discussed features of claims 5 and 11.

For at least the above-discussed reasons, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of claims 5 and 11. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect to claims 5 and 11. Reversal of the rejection of claims 5 and 11

under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

**Dependent claims 6 and 12**

Further, in addition to the above-discussed reasons for the reversal of the rejection of independent claims 1 and 7 and dependent claims 5 and 11, the rejection of claims 6 and 12 that respectively depend from claims 5 and 11, which in turn respectively depend from independent claims 1 and 7, should be reversed for at least the following additional reasons.

Claims 6 and 12 each recite that “the gear ratio between the drive motor and the ring gear is proportional to a friction force between a planet carrier and the speed calibration member.”

As conceded in the Final Office Action at page 4, Ito fails to teach or suggest the above-discussed features of claims 6 and 12.

Kushino fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito. More specifically, Kushino discloses that, in Fig. 2, when rotations of the output shaft 21 exceed a predetermined value, “a centrifugal clutch (13) prevents the rotation of the ring gear.” Kushino at Abstract. However, in Fig. 2 of Kushino, such a prevention of the rotation of the ring gear 29 due to an engagement by the centrifugal clutch 29 at a high speed of the output shaft 21 does not teach or suggest that a gear ratio is proportional to a friction force. The remainder of Kushino’s disclosure fails to cure the foregoing deficiencies. Thus, Kushino fails to teach or suggest the above-discussed features of claims 6 and 12.

Black fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito and Kushino. More specifically, the Final Office Action at page 8 cites column 11, lines

11-24, of Black as showing features related to a two-way universal clutch. In the cited portion, Black discloses that a Floyd drive unit is “basically a two-way universal clutch.” However, such a two-way universal clutch in Black and the remainder of Black’s disclosure fail to teach or suggest the above-discussed features of claims 6 and 12.

For at least the above-discussed reasons, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of claims 6 and 12. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect to claims 6 and 12. Reversal of the rejection of claims 6 and 12 under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

**Dependent claim 13**

Further, in addition to the above-discussed reasons for the reversal of the rejection of independent claim 7 and dependent claims 11 and 12, the rejection of claim 13, which depends from claim 12, which in turn depends from claim 11, which in turn depends from independent claim 7, should be reversed for at least the following additional reasons.

Claim 13 recites that “the speed calibration member is manually adjustable.”

As conceded in the Final Office Action at page 4, Ito fails to teach or suggest the above-discussed features of claim 13.

Kushino fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito. More specifically, Kushino discloses that, in Fig. 2, when rotations of the output shaft 21 exceed a predetermined value, “a centrifugal clutch (13) prevents the rotation of the ring gear.” Kushino at Abstract. However, in Fig. 2 of Kushino, such a prevention of the rotation



of the ring gear 29 due to an engagement by the centrifugal clutch 29 at a high speed of the output shaft 21 does not teach or suggest that a speed calibration member is manually adjustable. The remainder of Kushino's disclosure fails to cure the foregoing deficiencies. Thus, Kushino fails to teach or suggest the above-discussed features of claim 13.

Black fails to teach or suggest ways to overcome the above-discussed deficiencies of Ito and Kushino. More specifically, the Final Office Action at page 8 cites column 11, lines 11-24, of Black as showing features related to a two-way universal clutch. In the cited portion, Black discloses that a Floyd drive unit is "basically a two-way universal clutch." However, such a two-way universal clutch in Black and the remainder of Black's disclosure fail to teach or suggest the above-discussed features of claim 13.

For at least the above-discussed reasons, the proposed combination of Ito, Kushino and Black fails to teach or suggest all of the features of claim 13. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has **not** been established under 35 U.S.C. § 103 with respect to claim 13. Reversal of the rejection of claim 13 under 35 U.S.C. §103(a) as being unpatentable over the proposed combination of Ito, Kushino and Black is respectfully requested.

**(8) Conclusion**

For at least the reasons given above, the rejection of claims 1, 4-7, and 10-15 is improper. Accordingly, it is respectfully requested that such rejection by the Examiner be reversed and these claims be allowed. Attached below for the Board's convenience is an Appendix of claims 1, 4-7, and 10-15 as currently pending.

**PATENT**

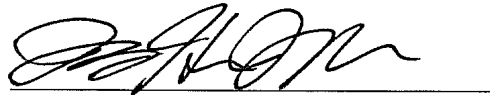
Atty Docket No.: 200207272-1  
App. Ser. No.: 10/789,744

Please grant any required extensions of time and charge any fees due in connection with this Appeal Brief to deposit account no. 08-2025.

Respectfully submitted,

Dated: June 9, 2009

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**(9) Claim Appendix**

1. (Previously Presented ) A carriage drive system, comprising:

a variable speed drive motor and a gearing mechanism configured to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle, and wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having:

a sun gear driven by the drive motor;

a ring gear; and

a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and

a centrifugal clutch operable to enable the gearing mechanism to switch between the first and second gear ratios automatically based upon an operational speed of the drive motor.

4. (Previously Presented) A carriage drive system according to claim 1, wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear.

5. (Previously Presented) A carriage drive system according to claim 1, further comprising a speed calibration member for adjusting a gear ratio between the drive motor and the ring gear.

6. (Previously Presented) A carriage drive system according to claim 5, wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between a planet carrier and the speed calibration member.

7. (Previously Presented) A printer, comprising:

- a movable carriage supporting print heads having an ink ejecting nozzle;

- a slide rod for supporting and guiding the movable carriage;

- a variable speed drive motor configured to propel the movable carriage along the slide rod, wherein the variable speed drive motor is an electric motor;

- a gearing mechanism having a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed, wherein the gearing mechanism comprises a planetary gear assembly having:

- a sun gear driven by the drive motor;

- a ring gear; and

- a plurality of planet gears arranged between the sun gear and the ring gear,

- wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and

- a centrifugal clutch operable to switch between the first and second gear ratios

wherein the centrifugal clutch is an automatic two-way clutch, such that switching between

the first and second gear ratios occurs automatically based upon an operational speed of the drive motor.

10. (Previously Presented) A printer according to claim 7, wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear.

11. (Previously Presented) A printer according to claim 7, further comprising a speed calibration member for adjusting a gear ratio between the drive motor and the ring gear.

12. (Previously Presented) A printer according to claim 11, wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between a planet carrier and the speed calibration member.

13. (Original) A printer according to claim 12, wherein the speed calibration member is manually adjustable.

14. (Previously Presented) A method for printing, comprising:

activating a variable speed drive motor and a gearing mechanism to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and, wherein the gearing mechanism has a first gear ratio resulting in a high

carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having:

a sun gear driven by the drive motor;

a ring gear; and

a plurality of planet gears arranged between the sun gear and the ring gear,

wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured

to rotate at a slower angular velocity than the sun gear; and

switching between the first and second gear ratios;

wherein switching between the first and second gear ratios occurs automatically based on an operational speed of the drive motor.

15. (Previously Presented) A method for printing according to claim 14, wherein operation of the drive motor at a high speed causes the planet gears and the drive gear to lock together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear.

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**(10) Evidence Appendix**

None.

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**(11) Related Proceedings Appendix**

None.